REBUILD ATLANTA
ENERGY AUDITOR'S REPORT
GROVE PARK RECREATION CENTER

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REPORT PREFACE

The information contained in this report consists of findings and recommendations conducted by the City of Atlanta's Energy Conservation Program through the Rebuild Atlanta initiative. The following information was gathered during a walk-through type audit designed to assess the general condition of the facility with an emphasis on discovering energy efficiency opportunities. All related observations and recommendations are based on the best available knowledge of the auditors and should not be considered conclusive, but rather an indication of building conditions. Any actions taken should be done so with the independent advice of experts. The Energy Conservation Program will be pleased to assist the Department of Parks, Recreation and Cultural Affairs in coordinating this technical assistance.

Building Summary

Grove Park Recreation Center **750 Frances Place** **Atlanta, Georgia 30318**	
Year Built:	1985
Building Size:	25,264 square feet (two stories)
Occupants:	5 FTE, three shifts
Operating Schedule:	12 noon - 9 p.m., M-F; 9 a.m. – 5 p.m., Sat; 9 a.m. – 1 p.m., Sun.
Electricity Cost (2003):	$26,040
Electricity Usage (2003):	365,880 kWh
Cost Per Square Foot:	$1.03/ft^2
Usage Per Square Foot:	14.48 kWh/ft^2

Recommendations

This section focuses on items that will be pursued by the Energy Conservation Program in cooperation with your department. Follow-up actions are outlined in more detail in Appendix A.

- Lighting
    - Retrofit all fixtures with T12 lamps and magnetic ballasts to T8 and electronic ballasts
    - Retrofit all incandescent downlamps with compact fluorescent lamps
    - Replace incandescent exit signs with LED/ENERGY STAR fixtures
    - Consider occupancy sensors for bathrooms, classrooms and other infrequently occupied areas
    - Consider retrofitting gymnasium with high-output fluorescent lighting (pending results of pilot program)

- Heating, Ventilation and Cooling
    - Install programmable thermostat/energy management system to enable temperature setback during unoccupied hours

Reported Items

This section contains items that were noted during the energy audits but do not fall under the scope of the Energy Conservation Program. Additional detail on these items is provided in Appendix B.

There are no items to report in this section.

Narrative

The Grove Park Recreation Center (GP Center) in Atlanta, GA, is part of the parks system in Atlanta. A wide range of activities is provided. The facility is owned and run by the City of Atlanta Parks Department.

A simplified calculation of the breakout of electric end-use energy is instructive for understanding how energy is used in the building and what potential means of reducing energy use and power might be. The first table below shows an estimate of energy use for lighting, plug loads, and rooftop unit fans for occupied and unoccupied periods. The estimate of cooling uses an averaging approximation of the seasonal mean power density requirements for cooling during the primary periods of cooling operation during the year. The heating energy is small, assumed to be near zero here. Outdoor security and street lighting is assumed under the lighting categories.

The "occ" or occupied period is supposed to represent the scheduled hours of the park, about 50 hr/wk. The "unocc" or unoccupied period is the difference between 8,760 hr/yr and the 2,600 occupied hr/yr.

Grove Park Rec Center, Atlanta, GA						
Rough electricity use breakout estimate						
End-use	Area, ft^2	W/ft^2	hr/yr	kWh/yr	$/kWh	Elec $ total
Lights, occ	27,000	1.1	2600	77,220	$0.07	$5,498
Lights, unocc	27,000	0.15	6160	24,948	$0.07	$1,776
Plug loads, occ	27,000	0.3	2600	21,060	$0.07	$1,499
Plug loads, unocc	27,000	0.1	6160	16,632	$0.07	$1,184
Fans, occ	27,000	1	2600	70,200	$0.07	$4,998
Fans, unocc	27,000	0.5	6160	83,160	$0.07	$5,921
Cooling	27,000	1.4	3800	75,600	$0.07	$5,383
Heating	27,000	0	4000	0	$0.07	$0
TOTAL				368,820		$26,260

The usage during unoccupied times is currently influenced by the absence of energy management controls to set back cooling and heating settings during unoccupied periods. The electricity use for fans and cooling during unoccupied times is fairly high, about 100,000 kWh/yr, or probably over 25% of total electricity use at the center.

Electricity use for the GP Center has been increasing dramatically in recent years, partly due to the gym now being cooled for the past couple years. Cooling operation is an important issue for this facility, as unoccupied temperature setpoints are the same as occupied, and variable loading on the large 30-ton system serving most of the spaces in the building may be causing humidity control difficulties, which in turn leads to overcooling.

Although not described in detail here, existing vents in the gym roof should be sealed completely if they are not already sealed well. Verification that they were completely sealed was not possible during the site visit.

Lighting

Except for the gym, most areas in the building have T12 40 W fluorescent lighting, which should be changed at least to T8 and a lower wattage. Floor area affected is about 12,000 square feet. Installed wattage is about 1.4 W/sf in many areas, but effective total wattage is about 1.1 W/sf for the 12,000 sf, a total of about 13 kW.

Total wattage should be able to be reduced to about half in an effective retrofit to T8 lighting and electronic ballasts, leading to savings of about 6.5 kW for 2,600 hr/yr, for an approximate savings of almost 17,000 kWh/yr, worth about $1,200/yr. Heating energy increased cost is assumed to be cancelled out by cooling savings.

Installed cost is estimated at $125 per fixture to replace pin ends and install a new electronic ballast and T8 lamps. Total fixtures are estimated at 75, for a total cost of about $9,400. Simple payback for these values is 7.8 years, based on the blended electric rate. Since the lighting retrofit should also change electric demand, savings should be greater than the $1,200 estimated above using the blended electric rate, so the simple payback is probably about 7 years.

HID lighting such as metal halide has fallen significantly behind in the technology and energy-efficiency race to fluorescent fixtures for high bay applications like gyms. Newer advanced fluorescent lighting fixtures for high-bay applications like gyms typically provide more light, much higher-quality light, and energy savings, when compared to HID lighting.

Fluorescent fixtures can have built-in occupancy sensors, so they can come on whenever someone is in the gym and can turn off when the gym is unoccupied. They come to full brightness fairly quickly. Energy savings is estimated at 25% of current HID fixtures. HID electric kW is estimated at approximately 10 kW, running for 2,000 hr/yr (20,000 kWh/yr). Savings of 25% is 5,000 kWh/yr, worth $350/yr at the blended electric rate (worth possibly $400/yr since peak kW will be reduced also). Heating energy increased cost is assumed to be cancelled out by cooling savings.

Installation cost is estimated at $400/fixture and 24 fixtures, for a total of $9,600. The simple payback is in the neighborhood of 25 years. A decision to proceed with this retrofit would have to be based on other considerations than energy alone. However, bundling all the measures together would make a reasonably attractive, overall package.

HVAC

The center currently has limited ability to set back heating and cooling setpoints during unoccupied periods, and the rooftop unit fans also run a lot of the time, reportedly continuously.

Cooling is provided by rooftop DX units: a 30-ton, old unit serving most zones in the building, two newer, 20-ton units serving the gym, and smaller units serving the side portion of the building.

Heating is primarily provided by hot water coils in the rooftop units.

Some means of controlling heating, cooling, and fan energy use during unoccupied times appears to have some significant benefit for reducing center energy use. Unoccupied times are currently 6,160 hr/yr.

Cooling temperatures could be set up to 83 F or so during unoccupied times. Heating setpoints could be reduced to 55 F or so. Fans could be changed to cycle on only when heating or cooling is demanded by thermostats at these extended setpoints.

Also, the gas-fired heating boiler (hot water) should probably be kept off completely from the last part of May until the last part of October (manual shutdown and startup).

Savings for adding this type of unoccupied period control of heating, cooling, and fans is estimated at 70,000 kWh/yr for reduced fan and cooling electricity and 1,000 CCF of gas. Electric cost savings would equal $4,900/yr at the blended electric rate, but may be only $4,000/yr since they occur outside of peak times. The gas savings is worth $630/yr at the rate of $6.30/DTh of gas. Total savings are then approximately $4,600/yr.

The boiler seasonal shutdown appears able to save an additional 700 CCF/yr, worth approximately an additional $400/yr.

The exact control scheme for achieving these savings is not described in any detail here, and will depend on several factors, including maintenance issues at the time of system design. In general, during the heating season the boiler and rooftop unit fans should be turned off when the building is scheduled to be unoccupied. The boiler should cycle on if building temperature drops to 55 F, and the rooftop unit fans should then run until the building is warmed up to 58 F or so, following which the boiler and fans should be turned off until the building temperature drops again to 55 F.

Depending on the level of control and experience with how long the heating system takes to bring the building back up to an acceptable temperature before activities begin each day, the heating system would be turned on at some time before occupancy to heat the building back up to an acceptable range each day. Avoid overheating.

During periods of cooling, the boiler should never run, and the cooling setpoints adjusted to maintain a reasonable balance of temperature, balancing zone needs as best possible. Cooling setpoints should rise to the 83 F or so mentioned above when building occupancy is scheduled to end, and rooftop unit fans should not run until the temperature rises to 83 F. The building should then be cooled down to 80 F, and then rooftop units turned off. Cooling units should be turned on an acceptable time before occupancy to cool the building down to an acceptable range.

The boiler should be off as much as possible. Gas use in June through October can probably be avoided almost entirely.

The building was very cool (68–70F) during the site visit of June 24, 2000, and was also very humid. The high humidity made this observer uncomfortable even with the cool temperatures. Raising the temperature setpoints during unoccupied times, followed by a startup cooldown period the next day, should improve the humidity situation in this building during the cooling season, although humidity will climb during unoccupied times.

Implementation cost is estimated as 20 control points with an overall bulk cost of $1,000 per control point — total of $20,000. This cost is intended to include any central controller hardware and software, terminal control point interface, and wiring. Adjustments to existing hardware, such as maintenance of control valves, is not included.

For a savings of $5,000/yr, including seasonal shutdown of the boiler, the simple payback for an installed cost of $20,000 is 4 years.

Goals

The goals for this building are focused on two areas, lighting and HVAC.

> Due to the relatively simple nature and straightforward benefits of a lighting retrofit, this building is an excellent candidate for a lighting retrofit in accordance with the City of Atlanta Lighting Guidelines. Due to the twenty four hour nature of this facility, it will have a faster than average payback. Some lighting technologies installed will have greater life and will reduce maintenance resources required for upkeep.
>
> The second major goal for the facility is to establish control over the HVAC system. It is likely that this measure, if properly implemented and maintained, will result in considerable savings for the facility without affecting occupant comfort.

Conclusion

Consistent with findings at other recreational facilities in the City of Atlanta, Grove Park reflects that the dedicated facility managers operating these centers could benefit from additional technical training to maximize their efforts and minimize energy waste. Given the appropriate knowledge and technology, the Bureau of Recreation can make a significant contribution to Atlanta's Energy Conservation Program.

Appendix A: Recommended Actions (Follow-up Actions Planned)

<u>Lighting</u>

Schedule lighting retrofit for all T12 fixtures and LED Exit Signs as recommended by the *City of Atlanta Lighting Retrofit Guidelines*.

Consider retrofit of gymnasium lighting with high output fluorescent (pending results of pilot program).

<u>HVAC</u>

Work with HVAC contractor to institute an HVAC controls system that enables temperature setback during unoccupied periods. See *Department of Parks, Recreation & Cultural Affairs, HVAC Controls Pilot Project* attached as separate document.

Appendix B: Reported Items (No Follow-up Action Planned)

There are no items to report in this section.

Appendix C: Additional Resources

Lighting

Please see separate attachments, *City of Atlanta Lighting Retrofit Guidelines*, for information on how to conduct a building lighting upgrade.

HVAC

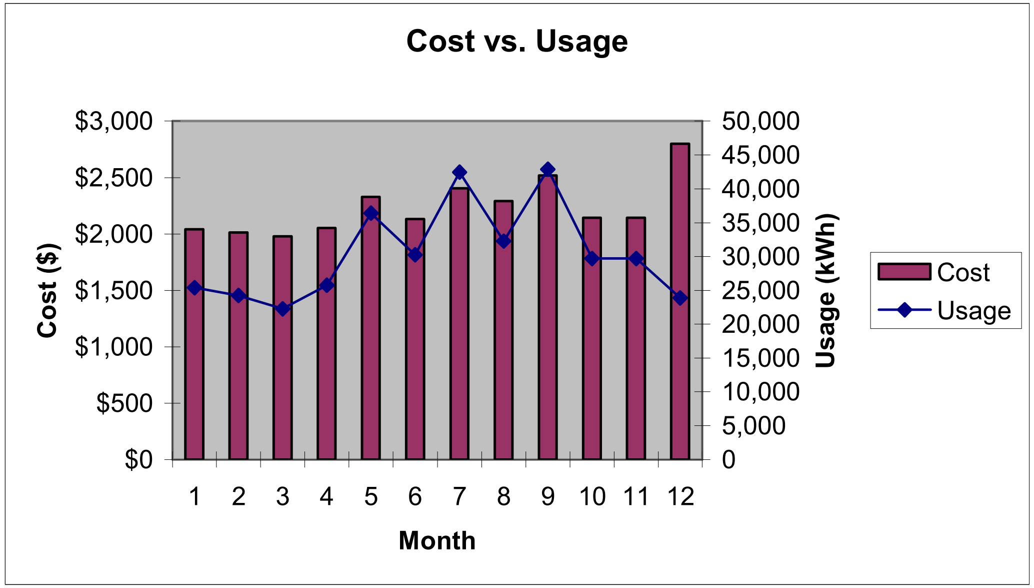
Please see the separate attachment, *Department of Parks, Recreation & Cultural Affairs, HVAC Controls Pilot Project*, for information on how to improve HVAC system control.

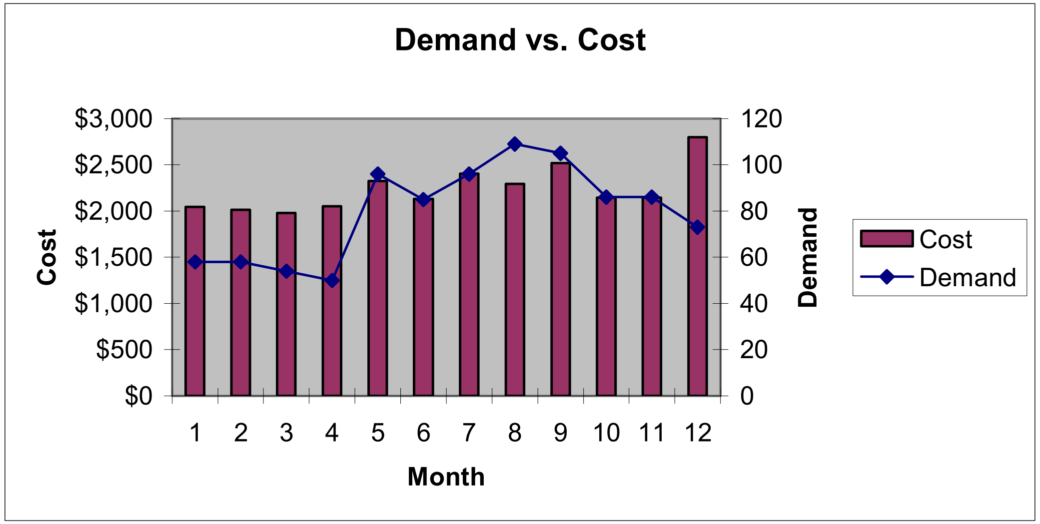
Appendix D: 12 Month Utility Data

The Table on the following page shows the electricity use, cost and peak demand for the year 2003. The top graph, labeled "Cost vs. Usage" shows the relationship between electricity consumption and cost for the year 2003. The bottom graph, labeled "Cost vs. Demand" shows the relationship between cost and peak demand for the year 2003

Natura;

Jan-03	25,380	58	$2,042
Feb-03	24,240	58	$2,013
Mar-03	22,290	54	$1,979
Apr-03	25,740	50	$2,052
May-03	36,420	96	$2,327
Jun-03	30,240	85	$2,132
Jul-03	42,480	96	$2,404
Aug-03	32,280	109	$2,293
Sep-03	42,900	105	$2,517
Oct-03	29,700	86	$2,143
Nov-03	29,700	86	$2,143
Dec-03	23,880	73	$2,798





Natural Gas Data

Month	CCF	Cost
Jan-02	996	$8,262
Feb-02	702	$6,847
Mar-02	407	$3,745
Apr-02	800	$1,498
May-02	396	$587
Jun-02	481	$37
Jul-02	161	$59
Aug-02	1	$106
Sep-02	1	$294
Oct-02	4	$1,917
Nov-02	99	$5,240
Dec-02	443	$7,552
Total	**4,491**	**$36,144**